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Agriculture

Forest  
Service

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# Soil Report

## Lover's Canyon Project

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Siskiyou County, California

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# Table of Contents

Soil Report.....	2
Introduction.....	2
Proposed Actions and Alternatives Analyzed.....	2
Methodology.....	2
Detailed Methodology .....	2
Analysis Indicators.....	3
Risk Assessments.....	4
Spatial and Temporal Bounding of Analysis Area .....	5
Affected Environment.....	5
Environmental Consequences.....	6
Alternative 1 – No Action.....	6
Direct Effects and Indirect Effects.....	6
Cumulative Effects.....	7
Effects Common to Alternatives 2 and 3.....	7
Direct and Indirect Effects .....	7
Cumulative Effects.....	9
Summary of Effects .....	9
Compliance with law, regulation, policy, and the Forest Plan .....	11
Literature Cited .....	14
Appendix A – Soil Map of the Project Area.....	15
Appendix B – Soil Map Unit Characteristics .....	16
Appendix C – Soil Interpretations- Alternative 2.....	X

## List of Tables

Table 2. Indicator Condition Assessment .....	3
Table 3. Compaction Risk Rating .....	4
Table 4. Soil Cover Guidelines for Vegetation and Fuels Management Projects.....	5
Table 5. Estimated Acres Not Meeting Desired Conditions for Soil Indicators and Activity .....	10
Table 6. Compliance with Forest wide Standards and Guidelines for Soil.....	11
Table 7. Soil Analysis of Intensity Factors for an EA .....	12

# Soil Report

## Introduction

This report analyzes impacts to soil indicators including soil stability, soil organic matter, and soil structure in the Lover's Canyon Project. These soil indicators address how well the project maintains long-term soil productivity as defined in the Klamath National Forest's Land Resource Management Plan (Forest Plan) (Table 6) (USDA 1995 as amended), the Regional Soil Management supplement to Forest Service Manual (FSM) direction (FSM 2500-2012-1) (USDA 2012a), and best available science (Powers et al. 2005). Potential impacts to soil function are analyzed and mitigated through project design features (PDFs) and best management practices (BMPs).

The project proposes to use a combination of silvicultural prescriptions and fuels treatments to allow the project to meet the purpose and need. The proposed silvicultural prescriptions include commercial and non-commercial thinning, and mastication. The proposed fuels treatments include strategic ridgetop treatments, roadside fuels reduction and underburning.

## Proposed Actions and Alternatives Analyzed

For a detailed description of the alternatives considered for detailed analysis and PDFs, see Chapter 2 of the Lover's Canyon Project Environmental Assessment. In summary, two alternatives are analyzed in this report: Alternative 1 – no action, Alternative 2 – proposed action.

## Methodology

### *Detailed Methodology*

A unit selection strategy was used to determine which units should have site-specific data collected. Selection was based on soil sensitivity and type of management activities planned. Soils with high compaction or erosion hazard ratings and areas with evidence of previous disturbance received a high priority for field review. Units proposed for ground-based commercial harvest have the highest probability of impacting the soil resource so those units were also a high priority for field review. Field investigation was done by making two to three traverses across each unit. Site and soil data was collected from plots along these traverses. The following types of existing site disturbances were identified in the field during the traverses: skid trails, full bench skid trails, old roads, and old landings. The level of soil disturbance was estimated for each soil disturbance type. Soil data noted in the field included shallow soil areas, rock outcrop, areas of surface rock, rock lithology and general soil depth. Existing order 2 soil survey information (Lower Scott River Soil Survey Area, 2017) was used unless field investigation revealed significant differences between mapped soils and the actual site-specific soils.

## Analysis Indicators

The effects of individual management activities on the soil resource (soil productivity and soil ecosystem functionality) is guided using the Forest Plan's Standards and Guidelines and FSM 2500, Chapter 2550, Supplement 2500-2012-1. Three indicators were chosen that best address relevant issues in the project and measure compliance with Forest Plan Standard and Guidelines. The indicators are soil stability, soil organic matter, and soil structure.

The unit measures for each indicator are acres not meeting desired conditions. Table 2 describes what constitutes desired conditions for each of the soil indicators. The proposed activities for the project were categorized into similar activity types. For example, all of the various silviculture treatments that use ground-based equipment were lumped into "Ground Based Tractor Logging with Associated Landings". The projected acres not meeting desired conditions for each indicator and activity type were determined from data collected from previous projects on the Forest using the National Forest Soil Disturbance Monitoring Protocol (NFSDMP) (USDA 2009). A summary of the most recent results from soil disturbance monitoring on the Forest are included in the Project Record (USDA 2012b).

**Table 1. Indicator Condition Assessment**

Soil Function	Indicators	Indicator Conditions		
		Good	Fair	Poor
		Meets Desired Condition	Partially Meets Desired Condition	Does Not Meet Desired Condition
Support for Plant Growth and Soil Hydrologic Functions	Soil Stability	An adequate level of soil cover is present and signs of erosion are not visible or very limited in degree and extent. Any existing erosion control measures are effective. Generally soil cover level is 50% or greater and is well distributed for soil types capable of supporting this level.	For minor portions of the area, soil cover is lacking and/or existing erosion control measures are ineffective and there are signs of erosion such as pedestals, sheet, rill, and/or gully erosion visible	Major portions of the area lack soil cover and/or lack effective erosion control measures. Signs of erosion such as pedestals, sheet, rill, and/or gully erosion are common.
Support for Plant Growth	Soil Organic Matter (SOM)	The thickness and color of the upper soil layer is within the normal range of characteristics for the site and is distributed normally across the area. Localized areas of displacement may have occurred but it will not affect the productivity	For minor portions of the area, the upper soil layer has been displaced or removed to a depth and area large enough to affect productivity for the desired plant species. Generally an area will be considered displaced if more than one-half of the upper soil layer or 4 inches (whichever is less) is removed from a	Major portions of the area have had the upper soil layer displaced or removed to a depth and area large enough to affect productivity for the desired plant species.

		for the desired plant species.	contiguous area larger than 100 sq. ft.	
Soil Hydrologic Function	Soil Structure	Visually soil structure and macro-porosity (defined here as pores 1mm or larger) are relatively unchanged from natural condition for nearly all the area. Signs of erosion or overland flow are absent or very limited in degree and extent. Infiltration and permeability capacity of the soil is sufficient for the local climate.	For minor portions of the area: soil structure and macro-porosity are changed; or platy structure and/or increased density evident; or overland flow and signs of erosion are visible. Infiltration and permeability capacity is insufficient in localized portions of the area.	Major portions of the area have reduced infiltration and permeability capacity indicated by soil structure and macro-porosity changes; or platy structure and/or increased density; or signs of overland flow and erosion.

## Risk Assessments

### Compaction Risk Rating

This risk rating scheme is intended to help determine the general susceptibility to loss of soil productivity from heavy equipment operation. It considers the risk that compaction will occur, and if compaction would result in productivity loss. It is based upon the soil texture and rock content. It presumes the soil is at field capacity or at a moisture level at which it is most susceptible to soil density increase under heavy equipment operation (USDA 2006)

**Table 2. Compaction Risk Rating**

Coarse Fragment Content by Volume	Soil Texture	Hazard Rating
Fragmental (> 70%)	Any Texture	Low
Skeletal (35 - 70%)	Sandy	Low
Skeletal (35 - 70%)	Loamy	Moderate
Skeletal (35 - 70%)	Clayey	High
< 35%	Sandy	Low
< 35%	Loamy	Moderate
< 35%	Silty	High
< 35%	Clayey	High

### Erosion Risk Rating

The Region 5 Soil Erosion Hazard Rating (EHR) System was used to rate the risk of soil erosion for all soils in the project area. This system uses various physical soil properties along with

climate and site-specific conditions to rate soils for hazard of sheet and rill erosion. This system is used to determine the amount of post-activity surface cover necessary to keep erosion hazard risk low or moderate (USDA 1990). In addition to the EHR system, the Forest Plan describes levels of total soil cover that should be maintained at the stand level to reduce the potential of soil erosion (Table 4).

**Table 3. Soil Cover Guidelines for Vegetation and Fuels Management Projects**

Soil Cover Guidelines for Projects		
Soil Texture Class	Slope (%)	Minimum Total Soil Cover* (%)
<b>Guidelines for Projects Using Tractors:</b>		
Sandy loam or coarser	0-25	70
	26-35	80
Loam or finer	0-45**	70
<b>Guidelines for Prescribed Burning Projects:</b>		
Sandy loam or coarser	0-25	60
	26-45	70
	46	80
Loam or finer	0-35	50
	36-60	60
	61	70
*Soil cover consists of low growing live vegetation (<12 inches high), rock fragments (greater than 1/2 inch in diameter), slash (any size) and fine organic matter (charred or not) that is in contact with the soil surface. Fine organic matter refers to the duff, litter, and twigs less than 3 inches in diameter.		
**Forest Service Manual Title 2521 Klamath Supplement 2 (01/1977)		

### ***Spatial and Temporal Bounding of Analysis Area***

For all three soil indicators, the analysis area is bounded by the project activity units, where disturbing activities take place. The analysis is further bounded in time by the foreseeable future period during which effects of this project could persist as detectable, significant effects. Soil cover, as it affects soil stability, can recover quickly as needles and other organic debris is deposited on the forest floor. The temporal boundary for soil stability is 5 years. Soil organic matter can take years to decades to rebuild after it is lost through displacement or erosion. The temporal boundary for soil organic matter is 30 years. Once compacted, structure, and macroporosity can remain affected for decades. The temporal boundary for soil strength and structure is 30 years.

### **Affected Environment**

The majority of the soils in the project area have developed from metavolcanic/metasediment parent material with small areas of peridotite and granite bedrock types. The majority of the soils

which are found on mountain side slopes in this project are moderately deep (24 to 40 inches) gravelly loams. The soils found on dormant landslide and glacial deposits are very deep (60+ inches) gravelly loams over clay loams. Found in pockets throughout the project area are soils developed from serpentinized parent material found within the areas of peridotite. These soils are moderately deep to deep gravelly loams with moderate soil productivity.

Erosion hazard rating (EHR) is a relative measure of the soils' sensitivity to erosion processes. Soil disturbance has the potential to increase the erosion hazard because soil cover is generally reduced. Erosion hazard rating was calculated for each of the treatment units to estimate the potential erosion hazard for a given soil type. First, a maximum erosion hazard rating was calculated for soil that is completely bare to determine the risk of soil loss in areas without protection from soil cover. The maximum EHR for all treatment areas is moderate to very high. The EHR for the current conditions of treatment areas was then calculated using data collected on existing conditions of soil cover. Current soil erosion hazard ratings for soils in treatment areas, based on existing conditions, are low.

Field sampling of units proposed to be treated using ground based systems was done. The average slope within these units ranges from 13 to 40% with an overall average of 25%. Average existing total soil cover ranges from 78 to 95% and averages 89%. Existing coarse woody debris (>20 inches diameter logs) in the sampled units ranges from 0 to 20.0 logs/acre and averages 6.5 logs/acre.

Using the National Forest Soil Disturbance Monitoring Protocol (NFSDMP), approximately 88% of the surveyed units were rated as disturbance class 0 (undisturbed), 7% were rated as class 1, 3% were rated as class 2, and 0% rated as class 3. The types of disturbance that were found include topsoil displacement on old full bench constructed skid trails, rutting on old skid trails, and compaction on old skid trails and landings. Desired conditions for soil stability were met across the entire project area because soil cover levels were very high and no signs of erosion were found. Desired conditions for soil organic matter and soil structure were met on an average of 96% of the project area.

## **Environmental Consequences**

### ***Alternative 1 – No Action***

#### **Direct Effects and Indirect Effects**

The No Action alternative would have no direct effect on soils, as soil disturbing project activities would not take place. Soil cover for erosion protection would not change in the project area. Soil organic matter would continue to accumulate faster than decomposition rates, with no additional benefit to soil fertility. Soil structure conditions would remain the same in the short-term, with very slow long-term natural recovery of old skid trails and landings.

Indirect effects of the No Action alternative would be the increased accumulation of organic matter in terms of surface and ladder fuels, with a corresponding continual increase in fire hazard. Years of fire suppression and past management activities have led to overly dense stands which have increased the risk of large-scale high severity wildfire. As fire intensity increases, the potential for soil organic matter destruction, nitrogen volatilization, microbial mortality, structure & porosity destruction, and inducement of water-repellency are greatly elevated. This can



severely damage soils and cause long-term declines in soil productivity and hydrologic function. In extreme cases, soils cannot be revegetated without management intervention.

Prescribed fire does not have the same effects on soils (Well et al 1979, McNabb and Cromack 1990). Fuels treatments such as thinning, prescribed fire and pile burning involve managing specifically for fire weather and fuel moisture during burns in order to moderate fire behavior, and avoid adverse environmental effects. These treatments usually also involve modification of the amount and distribution of fuels prior to fire being introduced.

### **Cumulative Effects**

Past actions including timber harvest and thinning are evident on the landscape in the project area and are reflected in the discussion of the affected environment. Since there are no other reasonable foreseeable future actions occurring in the project area that will have an effect on soils, there will be no cumulative effects of Alternative 1.

### **Effects Common to Alternatives 2 and 3**

For effects to soil resources there will be no measurable differences to the analysis indicators between alternatives 2 and 3 and these alternatives will be discussed together. Alternative 3 has more skip areas incorporated into a set of units than alternative 2, this difference will account for less total ground disturbance within these units, however, the difference is not enough to change the effect that the proposed treatments will have on the measure of the soils analysis indicators because the overall footprint of disturbance is the same between these alternatives.

### **Direct and Indirect Effects**

The proposed activities that may impact soil stability, soil organic matter, and soil structure desired conditions include ground-based tractor logging, temporary road construction, and mastication. Soil stability and soil organic matter are also affected by cable yarding, roadside hazard tree removal, and prescribed fire and pile burning. A summary of estimated acres in both action alternatives that do not meet desired conditions for soil stability, soil organic matter, and soil structure are in Table 5. The total acres not meeting desired conditions for soil stability, soil organic matter, and soil structure are 36, 64, and 23, respectively and are within the acceptable disturbance levels according to the forest plan.

### **Ground-based tractor logging**

Ground based tractor logging with associated landings will result in reduced levels of soil cover on skid trails and landings but project design features will reduce the potential for soil erosion. PDFs require minimum levels of soil cover depending on slope steepness and require cover levels to be met before the fall rainy season. The PDF that prescribes placement of water bars on skid trails and erosion control on landings will be effective in controlling runoff and preventing off-site sedimentation. Additionally, PDFs limit the slope steepness for operating ground-based logging equipment to slopes less than 35% on sandy soils and up to 45% on gravelly loam textures or finer, which will reduce the potential for soil erosion on steeper slopes. The high amounts of soil cover in non-skid trail areas will act as sediment filters and prevent skid trail derived sediment from reaching a drainage channel. Best Management Practice (BMP)

monitoring of skid trails and landings show that water bars and erosion control measures are effective in controlling erosion and preventing sediment from reaching a stream course (USDA 2011). Monitoring from previous projects with ground-based tractor logging units indicates that 95% of the unit meets desired conditions for soil stability.

A combination of increased compaction, reduced soil cover, and soil displacement will lead to a loss of nutrients on the skid trails and landings in units where ground based tractor logging takes place. PDFs including placement of water bars, slope restrictions on ground-based equipment, and soil cover guidelines were designed to minimize the loss of soil organic matter from the unit. Additionally, PDFs to protect coarse woody debris will insure these features will provide soil nutrients into the future. Monitoring from previous projects with ground-based tractor logging units indicates that 90% of the unit meets desired conditions for soil organic matter.

Ground-based equipment will cause soil compaction on landings and main skid trails, but with proper layout, the level of disturbance can be kept below levels that would impact stand productivity. Placing a high priority on reusing existing skid trails will help to ensure that the area occupied by skid trails can be minimized. Soil compaction leading to poor soil strength and structure would occur on the heavily used portions of main skid trails and landings. On skid trails where machinery makes one or two passes, compaction increases only slightly; rooting environment and infiltration are not negatively affected. PDFs put limitations on the use of ground based equipment during wet weather and saturated soil conditions reducing the amount of compaction on skid trails. Monitoring from previous projects with ground-based tractor logging units indicates that 95% of the unit meets desired conditions for soil structure.

### **Skyline logging**

Skyline cable logging would result in small amounts of soil displacement in the yarding corridors from the tail end of the log dragging on the soil surface. This log dragging usually does not occur over the entire corridor length. The cable corridor can vary from 6 to 8 feet wide and would have an area in the center of the corridor that is down cut 9 to 12 inches deep (past field observations and BMP monitoring). When properly water barred, no significant erosion would leave the harvest units. Soil compaction and reduced soil porosity would be minimal to none. Monitoring of previous projects with cable logging units indicates that desired conditions for soil stability, soil organic matter, and soil structure are met across 97, 96, and 100 percent of units, respectively.

### **Endline Tree Removal**

Endline tree removal will cause small amounts of soil displacement in the yarding corridors for each felled tree. Existing high levels of soil cover will function to minimize soil exposure. Soil stability will be maintained by placing slash or water bars where endlining has disturbed the soil surface and erosion could occur. Soil organic matter will be protected by maintaining a minimum of 50-70% of soil cover depending on slope steepness and fuel reduction treatments. Soil stability, soil organic matter, and soil structure desired conditions are expected to be met for endline tree removal treatments.

### **Prescribed fire and pile burning**

Prescribed fire is a low to moderate intensity fire that is used to reduce fuel loads and fire hazards in. The impacts of prescribed fire on fuel loads and surface soil conditions can vary considerably depending on fuel characteristics and loading, soil climatic conditions at the time of burning, and resulting soil burn severity. Spring burns tend to consume less ground fuels than fall burns because of higher fuel and soil moisture levels, leaving higher total soil cover levels post-fire. Recent soil cover monitoring of prescribed fire on the Forest for the BMP monitoring report has shown that post-burn soil cover exceeds levels prescribed in standards and guidelines (USDA 2011). If soil cover guidelines are followed, soil stability desired conditions are expected to be met for prescribed fire and pile burning treatments.

Prescribed fire and pile burning can alter microbial communities in a forest stand by increasing the temperature of the post burn soil surface or changing the availability of organic substrates. Soil heating during the burn results in a substantial short-term loss of microbial biomass or a shift in community structure. These changes, and their duration, are the result of the interactions of fuel load, fuel moisture content, weather conditions, landscape position, light-up sequence, and resulting fire behavior and resident time combined with heat transfer variability within the soil profile (Busse et al. 2005). The low and moderate burn severities that are prescribed for this project will have short term impacts to soil organic matter and microbial communities. These impacts will not affect the long term productivity of the project area. If burn severities are kept to low and moderate levels, soil organic matter desired conditions are expected to be met for prescribed fire and pile burning treatments.

### **Cumulative Effects**

Past actions including timber harvest and thinning are evident on the landscape in the project area and are reflected in the discussion of the affected environment. Adding the effects of alternative 2 or 3 to the effects of past and present actions is not expected to have substantial negative effects on soil desired conditions and, therefore, no substantial negative cumulative effects will occur. A summary of acres not meeting desired conditions can be found in table 5. For alternative 2 or 3 the percent of the total treatment area not meeting desired conditions for soil stability, soil organic matter, and soil structure is 0.7%, 1.3%, and 0.5%, respectively (Table 5). These areas will account for minor portions of any one stand, so stand productivity will not be affected. The few negative effects from either action alternative will very slightly affect the area in the short term but will help greatly in the long term in effects such as fire resiliency, soil health, and overall soil water availability.

### **Summary of Effects**

There would be no direct effects of the No Action Alternative as soil disturbing project activities would not take place. Soil cover for erosion protection would not change in the project area. Soil organic matter would continue to accumulate faster than decomposition rates, with no additional benefit to soil fertility. Soil structure conditions would remain the same in the short-term, with very slow long-term natural recovery of old skid trails and landings.

For alternative 2 or 3, the total acres not meeting desired conditions for soil stability, soil organic matter, and soil structure are 36, 64, and 23, (Table 5) respectively. The majority of acres not meeting desired conditions are a result of ground-based tractor logging and associated landings construction. To a lesser degree, skyline logging, and endline tree removal contribute to the total acres not meeting desired conditions.

For the action alternatives, implementation of PDFs will reduce the potential for negative effects from soil disturbing activities. Both action alternatives will maintain adequate soil cover, protect soil organic matter, and maintain soil structure at levels sufficient to protect soil productivity and prevent soil erosion. The acres that do not meet desired conditions will be minor compared to the total treatment acres in the project. For either alternative 2 or 3 the percent of the total treatment area not meeting desired conditions for soil stability, soil organic matter, and soil structure is 0.7%, 1.3%, and 0.5%, respectively (Table 5). These areas will account for minor portions of any one stand, so stand productivity will not be affected.

**Table 4. Estimated Acres Not Meeting Desired Conditions for Soil Indicators and Activity**

Activity	Estimated Percent Not Meeting Desired Conditions Determined from Disturbance Monitoring on the Klamath NF	Alternative 2 or 3
		Acres Not Meeting Desired Conditions (Estimated)
Ground Based Tractor Logging		
Soil Stability	5%	25
Soil Organic Matter	10%	46
Soil Structure	5%	23
Skyline Logging		
Soil Stability	3%	13
Soil Organic Matter	4%	18
Soil Structure	0%	0
Endline Treatment		
Soil Stability	0%	0
Soil Organic Matter	0%	0
Soil Structure	0%	0
Mastication		
Soil Stability	5%	7
Soil Organic Matter	5%	7
Soil Structure	0%	0
Hand piling/fuel break/pile burning/meadow treatment		
Soil Stability	0%	0
Soil Organic Matter	0%	0
Soil Structure	0%	0
Prescribed Underburning		
Soil Stability	0%	0
Soil Organic Matter	0%	0

Soil Structure	0%	0
<b>Total Acres Not Meeting Desired Conditions</b>		
Soil Stability		<b>36</b>
Soil Organic Matter		<b>64</b>
Soil Structure		<b>23</b>
<b>Total % of the Treatment Area Not Meeting Desired Conditions</b>		
Soil Stability		<b>0.7%</b>
Soil Organic Matter		<b>1.3%</b>
Soil Structure		<b>0.5%</b>

### ***Compliance with law, regulation, policy, and the Forest Plan***

Forest Plan Standards and Guidelines for soils will be met for all Alternatives. The number of acres that do not meet desired conditions for soil structure, soil organic matter, and soil structure is minor in relation to the project area, and is reduced to the extent possible with PDFs.

**Table 5. Compliance with Forest wide Standards and Guidelines for Soil**

<b>S&amp;G No.</b>	<b>LRMP Direction</b>	<b>Project Conformance to S&amp;G</b>
<b>Soils</b>		
3-1	Plan and implement land management activities to maintain or enhance soil productivity and stability.	Complies. PDFs mitigate negative impacts of project activities on soil productivity and stability
3-2	Maintain soil cover of 70% or 80% (depending upon slope and soil type) on tractor units; maintain soil cover of 50% to 80% on prescribed burn units, depending upon slope and soil type (see LRMP, pg. 4-20). With the exception of roads, permanent facilities or other projects that will permanently occupy a site, the following levels of total soil cover should be maintained at the stand level to reduce the potential of soil erosion (see LRMP for the levels of total soils cover table):	Complies. PDFs require post treatment soil cover levels to meet this S&G
3-3	Maintain soil productivity by retaining organic material on the soil surface and by retaining organic material in the soil profile.	Complies. PDFs restrict activities that would remove surface and soil organic material to the extent where soil productivity is affected
3-4	A minimum of 50% of the soil surface should be covered by fine organic matter following project implementation, if it is available on site.	Complies. PDFs require post treatment soil cover levels to meet this S&G
3-5	Maintain a minimum of 85% of the existing soil organic matter in the top 12 inches of the soil profile to allow for nutrient cycling and maintain soil productivity.	Complies. PDFs restrict activities that would remove surface and soil organic material to the extent where soil productivity is affected
3-6	Refer to the Coarse Woody Debris (CWD) section of Biological Diversity under Biological Environment for coarse woody debris standards and guidelines designed to maintain soil fertility and provide for species needs.	Complies. PDFs require protecting pieces of CWD during project activities
3-7	Complete a Soils Resource Inventory Order 2 inventory when necessary, or field verify the Soils Resource Inventory Order 3 survey, during the planning and implementation phase of each site-disturbing or vegetative manipulation project. Develop soil conservation management practices for each project as needed.	Complies. The Order 2 soil survey for this project area was mapped in 1991.

### Summary of effects and their relationship to significance factors

Below is a summary of effects and their relationship to significance factors (context and intensity) to support a finding of no significant impact, as it relates to the soil resource (40 CFR 1508.27).]

**Table 6. Soil Analysis of Intensity Factors for an EA**

INTENSITY FACTORS	HOW APPLICABLE TO THE SOIL RESOURCE
Beneficial and adverse impacts	Provides long-term protection for soil productivity for the project area. No significant impacts.
The degree to which the proposed action affects public health	None
Unique characteristics of the geographic area	None. Soil in the Project area does not have unique characteristics such as prime farmland.
The degree to which the effects on the human environment are likely to be highly controversial	None
The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks	None. Monitoring data of similar activities from previous projects on the Klamath National Forest provide a reasonable degree of certainty of possible effects.
The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration	None
Whether the action is related to other actions with individually insignificant but cumulatively significant impacts	None. No significant cumulative effects to the soil resource are expected.
The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historical resources	None
The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973	None

Whether the action threatens a violation of Federal, State, or local law or other requirements imposed for the protection of the environment	No
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DRAFT

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## Appendix A – Soil Map of the Project Area

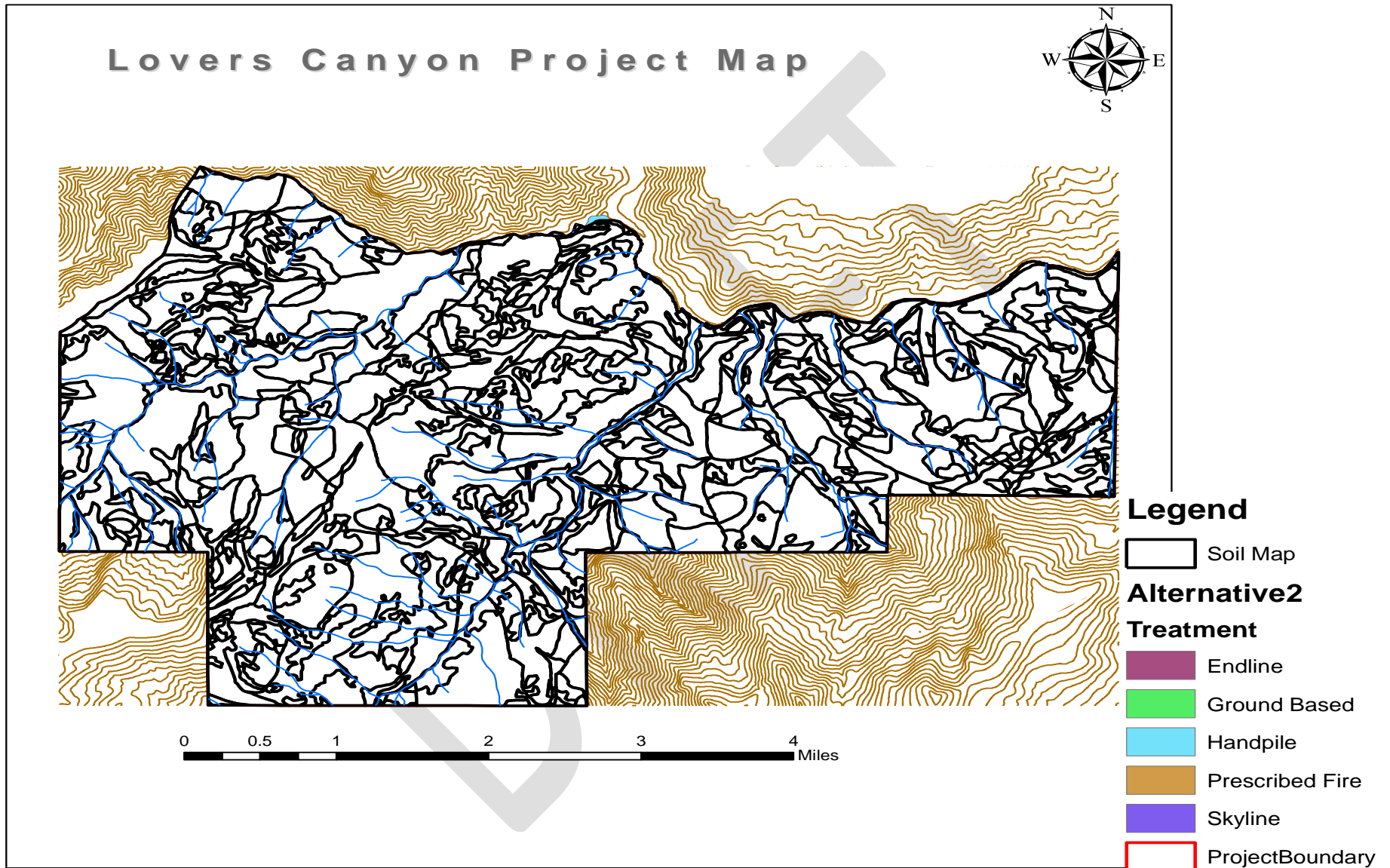


Figure 1. Soil Map of the Project Area

## Appendix B – Soil Map Unit Characteristics

Order 2 Soil Mapunit	Mapunit Name	Parent Material	Surface Texture	Soil Depth (in)	Soil Productivity (FSSC)			Max EHR	Acres In Project Area
					NW-NE	E-NW	SE-W		
100b	Diggles	ms	xgl	20-40	4	4	5	M	15
100c	Diggles	ms	xgl	20-40	4	4	5	M	63
100cd	Diggles	ms	xgl	20-40	4	4	5	H	13
100d	Diggles	ms	xgl	20-40	4	4	5	VH	7
185b	Happycamp/Westbranch	ms	gs/sl	40-60/20-40	3	3	4	M	25
185c	Happycamp/Westbranch	ms	gs/sl	40-60/20-40	3	3	4	H	59
185cd	Happycamp/Westbranch	ms	gs/sl	40-60/20-40	3	3	4	VH	3
186b	Marpa	ms	gl	20-40	3	4	4	H	12
186bc	Marpa	ms	gl	20-40	3	4	4	VH	6
186c	Marpa	ms	gl	20-40	3	4	4	VH	93
186d	Marpa	ms	gl	20-40	3	4	4	H	108
195cd	Marpa/Vitzthum	m	vgsl/xgl	20-40/<20	3	4	4	VH	13
211b	Neuns/Deadwood	ms	vgl/gl	20-40/<20	3	3	4	L	2
211c	Neuns/Deadwood	ms	vgl/gl	20-40/<20	3	3	4	H	94
211cd	Neuns/Deadwood	ms	vgl/gl	20-40/<20	3	3	4	VH	33
211d	Neuns/Deadwood	ms	vgl/gl	20-40/<20	3	3	4	VH	42
235ab	Riverwash	alv	s,vcbs	60+	7	7	7	L	63
238c	Rx/Chawanakee	d	rx/sl	rx/<20	6	6	6	VH	1
238d	Rx/Chawanakee	d	rx/sl	rx/<20	6	6	6	VH	1
240bc	Rx/Saltcreek	d	rx/vgsl	rx/<20	7	7	7	VH	2
240c	Rx/Saltcreek	d	rx/vgsl	rx/<20	7	7	7	VH	7
240d	Rx/Saltcreek	d	rx/vgsl	rx/<20	7	7	7	VH	123
246c	Rx/Woodseye	m	rx/vgsl	rx/<20	5	5	6	VH	15

246d	Rx/Woodseye	m	rx/vgsl	rx/<20	5	5	6	VH	84
259bc	Rubble land	gb	xcb	Rubble Land	5	6	6	L	3
300b	Hiyou Overburden/ Althouse Overburden	m	vgl/vgl	40-60/40-60	2	3	3	L	5
300c	Hiyou Overburden/ Althouse Overburden	m	vgl/vgl	40-60/40-60	2	3	3	L	4
300cd	Hiyou Overburden/ Althouse Overburden	m	vgl/vgl	40-60/40-60	2	3	3	M	8
301b	Baldcreek/Fiddletown	m	vgl/vgl	40-60/20-40	2	2	3	M	4
301c	Baldcreek/Fiddletown	m	vgl/vgl	40-60/20-40	2	2	3	H	33
301cd	Baldcreek/Fiddletown	m	vgl/vgl	40-60/20-40	2	2	3	VH	43
304a	Pishpishee	m	gl	60+	2	2	3	M	16
304ab	Pishpishee	m	gl	60+	2	2	3	M	4
304b	Pishpishee	m	gl	60+	2	2	3	M	342
304c	Pishpishee	m	gl	60+	2	2	3	H	702
304cd	Pishpishee	m	gl	60+	2	2	3	VH	15
304d	Pishpishee	m	gl	60+	2	2	3	VH	39
321c	Woodseye/Rx	m	vgl	<20/rx	5	6	7	H	13
321cd	Woodseye/Rx	m	vgl	<20/rx	5	6	7	VH	43
321d	Woodseye/Rx	m	vgl	<20/rx	5	6	7	VH	51
351bc	Deadwood/Neuns/Rx	m	gl/vgl	<20/20-40/rx	5	6	7	H	4
351c	Deadwood/Neuns/Rx	m	gl/vgl	<20/20-40/rx	5	6	7	VH	126
351cd	Deadwood/Neuns/Rx	m	gl/vgl	<20/20-40/rx	5	6	7	VH	441
351d	Deadwood/Neuns/Rx	m	gl/vgl	<20/20-40/rx	5	6	7	VH	247
359b	Kindig	m	gl	40-60	4	4	5	M	5

359c	Kindig	m	gl	40-60	4	4	5	H	17
362c	Kindig/Pishpishee	m	vgl/gl	40-60/60+	2	2	3	H	17
362d	Kindig/Pishpishee	m	vgl/gl	40-60/60+	2	2	3	VH	6
368b	Fiddletown/McAdams	m	xgl/vgl	20-40/<20	3	4	4	VH	2
368c	Fiddletown/McAdams	m	xgl/vgl	20-40/<20	3	4	4	VH	48
368d	Fiddletown/McAdams	m	xgl/vgl	20-40/<20	3	4	4	VH	42
405b	Marpa/Hoosimbim/Dead wood	m	vgl/gl/vgl	20-40/40-60/<20	3	4	4	M	2
405c	Marpa/Hoosimbim/Dead wood	m	vgl/gl/vgl	20-40/40-60/<20	3	4	4	H	115
405d	Marpa/Hoosimbim/Dead wood	m	vgl/gl/vgl	20-40/40-60/<20	3	4	4	VH	138
415a	Rosiane	alv	vgl	40-60+	5	5	6	L	4
415ab	Rosiane	alv	vgl	40-60+	5	5	6	L	11
460ab	Happycamp/Highpoint	m	vgl/gl	40-60/20-40	5	5	6	M	22
460b	Happycamp/Highpoint	m	vgl/gl	40-60/20-40	2	2	2	M	24
460c	Happycamp/Highpoint	m	vgl/gl	40-60/20-40	2	2	2	H	233
460cd	Happycamp/Highpoint	m	vgl/gl	40-60/20-40	2	2	2	VH	687
460d	Happycamp/Highpoint	m	vgl/gl	40-60/20-40	2	2	2	VH	136
465c	Woodseye/Highpoint	m	vgl/gl	<20/20-40	4	4	5	H	80
465cd	Woodseye/Highpoint	m	vgl/gl	<20/20-40	4	4	5	H	16
465d	Woodseye/Highpoint	m	vgl/gl	<20/20-40	4	4	5	H	223
466b	Highpoint/Woodseye	m	gl/vgl	20-40/<20	4	4	4	M	12
466c	Highpoint/Woodseye	m	gl/vgl	20-40/<20	4	4	4	H	152
466cd	Highpoint/Woodseye	m	gl/vgl	20-40/<20	4	4	4	VH	30
466d	Highpoint/Woodseye	m	gl/vgl	20-40/<20	4	4	4	VH	222
488b	Uhkawaht/Keetah	m	gl/vgl	20-40/60+	4	4	5	M	1
488c	Uhkawaht/Keetah	m	gl/vgl	20-40/60+	4	4	5	H	36
488d	Uhkawaht/Keetah	m	gl/vgl	20-40/60+	4	4	5	VH	9
493a	Cheeshee	m	vgl	60+	2	2	5	M	67

493ab	Cheeshee	m	vgl	60+	2	2	5	M	4
493b	Cheeshee	m	vgl	60+	2	2	5	m	736
493c	Cheeshee	m	vgl	60+	2	2	3	H	1044
493d	Cheeshee	m	vgl	60+	2	2	3	VH	56
511b	Smokey/Althouse	m	vgl/vgl	20-40/40-60	4	4	4	M	9
511c	Smokey/Althouse	m	vgl/vgl	20-40/40-60	4	4	4	H	325
511cd	Smokey/Althouse	m	vgl/vgl	20-40/40-60	4	4	4	VH	221
511d	Smokey/Althouse	m	vgl/vgl	20-40/40-60	4	4	4	VH	225
520d	Xansipi/Pushipish	gb	xgl/vcbsl	<20/20-40	5	5	6	VH	23
529a	Pishpishee/Coosewayp	m	gl/l	60+/60+	2	2	3	M	6
529b	Pishpishee/Coosewayp	m	gl/l	60+/60+	2	2	3	M	61
529c	Pishpishee/Coosewayp	m	gl/l	60+/60+	2	2	3	H	161
529d	Pishpishee/Coosewayp	m	gl/l	60+/60+	2	2	3	VH	13
534c	Skymor/Smokey	m	vgsl/vgsl	<20/20-40	5	5	6	H	8
534cd	Skymor/Smokey	m	vgsl/vgsl	<20/20-40	5	5	6	VH	39
53c	Siskiyou/Dome	g	sl/gsl	20-40/40-60	3	4	4	H	9
53d	Siskiyou/Dome	g	sl/gsl	20-40/40-60	3	4	4	VH	45
542c	Siskiyou/Hiker	d	cosl/cosl	20-40/40-60	4	4	5	VH	3
542d	Siskiyou/Hiker	d	cosl/cosl	20-40/40-60	4	4	5	VH	94
563c	Parks/Gozem	p	gsl/vgl	40-60/<20	3	4	4	M	9
563d	Parks/Gozem	p	gsl/vgl	40-60/<20	3	4	4	H	8
565a	Bluefox	p	vgl	60+	2	3	3	M	6
565b	Bluefox	p	vgl	60+	3	4	4	M	2
565c	Bluefox	p	vgl	60+	3	4	4	H	2
565d	Bluefox	p	vgl	60+	3	4	4	VH	11
570bc	Gozem/Rx	s	vgl/rx	<20/rx	5	6	7	H	7
570d	Gozem/Rx	s	vgl/rx	<20/rx	5	6	7	VH	9
571a	Scotbar	p	vgl	60+	3	4	4	M	3
571b	Scotbar	p	vgl	60+	3	4	4	M	6
571c	Scotbar	p	vgl	60+	3	4	4	H	7

583ab	Coboc/Tommartin	alf	gl/gl	60+/60+	1	2	3	M	41
583b	Coboc/Tommartin	alf	gl/gl	60+/60+	1	2	3	M	18
583c	Coboc/Tommartin	alf	gl/gl	60+/60+	1	2	3	H	12
585b	Pah/Faulkscomp	p	gl/vgl	20-40/40-60	3	4	4	H	10
585c	Pah/Faulkscomp	p	gl/vgl	20-40/40-60	3	4	4	H	47
587b	Althouse/Avarahaira	m	vgsl/vgsl	40-60/60+	3	3	4	H	12
587c	Althouse/Avarahaira	m	vgsl/vgsl	40-60/60+	3	3	4	H	279
587cd	Althouse/Avarahaira	m	vgsl/vgsl	40-60/60+	3	3	4	VH	39
587d	Althouse/Avarahaira	m	vgsl/vgsl	40-60/60+	3	3	4	VH	59
588b	Cabintill	p	vgl	60+	3	4	4	M	71
588c	Cabintill	p	vgl	60+	3	4	4	H	67
588d	Cabintill	p	vgl	60+	3	4	4	VH	3
592d	Cabinflower/ Calflake/Rx	p	vgsl/l/rx	<20/20-40/rx	6	7	7	M	11
598b	Cabinflower/ Cabinilly/Talus	p	vgsl/l/rx	<20/20- 40/tallus	6	7	7	M	4
598c	Cabinflower/ Cabinilly/Talus	p	vgsl/l/rx	<20/20- 40/tallus	6	7	7	M	54
598d	Cabinflower/ Cabinilly/Talus	p	vgsl/l/rx	<20/20- 40/tallus	6	7	7	M	4
600b	Coonhollow	m	vgl	60+	1	2	2	M	9
600c	Coonhollow	m	vgl	60+	1	2	2	H	18
605bc	Middlecreek/Mountaincr eek/Rx	sp	vgl/gl/rx	<20/20-40/rx	5	5	6	H	4
605c	Middlecreek/Mountaincr eek/Rx	sp	vgl/gl/rx	<20/20-40/rx	5	5	6	H	17
605d	Middlecreek/Mountaincr eek/Rx	sp	vgl/gl/rx	<20/20-40/rx	5	5	6	VH	10
60c	Chawanakee/Siskiyou	g	gcosl/cosl	<20/20-40	5	5	6	VH	1
60cd	Chawanakee/Siskiyou	g	gcosl/cosl	<20/20-40	5	5	6	VH	1

60d	Chawanakee/Siskiyou	g	gcosl/cosl	<20/20-40	5	5	6	VH	1
614b	Coosewyap	m	vgl	60+	2	2	2	M	3
614c	Coosewyap	m	vgl	60+	2	2	2	H	48
628ab	Umtupitch	alv	cbl	40-60+	2	3	3	M	1
628b	Umtupitch	alv	cbl	40-60+	2	3	3	M	127
628c	Umtupitch	alv	cbl	40-60+	2	3	3	H	336
628d	Umtupitch	alv	cbl	40-60+	3	3	4	VH	1
640a	Eechwah/Cheeshee	m	vgl/vgl	60+/60+	2	2	3	M	4
640b	Eechwah/Cheeshee	m	vgl/vgl	60+/60+	2	2	3	M	94
640c	Eechwah/Cheeshee	m	vgl/vgl	60+/60+	2	2	3	H	640
640cd	Eechwah/Cheeshee	m	vgl/vgl	60+/60+	2	2	3	VH	63
640d	Eechwah/Cheeshee	m	vgl/vgl	60+/60+	2	2	3	VH	101
648d	Teerunchook/Uhguesh	d	gsl/gsl	20-40/<20	4	4	5	VH	29
654bc	Kangaroocreek/Ipuhhuh/Rx	d	gsl/vgsl/rx	<20/<20/rx	5	6	7	VH	1
664b	Kangaroocreek/Ipuhhuh/Rx	d	gsl/vgsl/rx	<20/<20/rx	2	2	3	M	23
664c	Kangaroocreek/Ipuhhuh/Rx	d	gsl/vgsl/rx	<20/<20/rx	2	2	3	H	129
664cd	Kangaroocreek/Ipuhhuh/Rx	d	gsl/vgsl/rx	<20/<20/rx	2	2	3	VH	31
670ab	Box	m	gl	60+	2	3	3	M	6
670b	Box	m	gl	60+	2	3	3	M	10
670c	Box	m	gl	60+	2	3	3	H	7
676b	Uckwaht/Rx	m	xgsl/rx	20-40/rx	4	4	5	M	4
676bc	Uckwaht/Rx	m	xgsl/rx	20-40/rx	4	4	5	H	4
676c	Uckwaht/Rx	m	xgsl/rx	20-40/rx	4	4	5	H	17
676d	Uckwaht/Rx	m	xgsl/rx	20-40/rx	4	4	5	VH	26
679c	Rx/Cabbinflower/Rubble Land	p	gls	rx/<20/rubble	7	7	7	L	15

679d	Rx/Cabbinflower/Rubble Land	p	gls	rx/<20/rubble	7	7	7	L	23
680b	Yoothookie	alv	Sil	60+	5	5	6	M	3
692b	Marblevalley	m	Sil	40-60+	3	3	3	M	15
692c	Marblevalley	m	Sil	40-60+	3	3	3	H	37
695b	Gemlake	p	vgl	40-60	3	3	4	M	5
695c	Gemlake	p	vgl	40-60	5	5	6	H	7
697d	Rx/Sophia	m	rx/vgl	rx/<20	7	7	7	H	5
6b	Hossimbim/Marpa	p/s	vgl/gl	40-60/20-40	2	2	2	M	15
6c	Hossimbim/Marpa	p/s	vgl/gl	40-60/20-40	2	2	2	H	114
6d	Hossimbim/Marpa	p/s	vgl/gl	40-60/20-40	2	2	2	VH	81
701c	Uckwaht/Mountainlake/Talus	m	vgl/vgl	20-40/60+	4	4	5	H	13
701cd	Uckwaht/Mountainlake/Talus	m	vgl/vgl	20-40/60+	4	4	5	VH	3
701d	Uckwaht/Mountainlake/Talus	m	vgl/vgl	20-40/60+	4	4	5	VH	5
703b	Greenvalley/Westgrinder	p	vgl/gl	20-40/40-60	3	4	5	H	5
703c	Greenvalley/Westgrinder	p	vgl/gl	20-40/40-60	3	4	5	H	40
703d	Greenvalley/Westgrinder	p	vgl/gl	20-40/40-60	3	4	5	H	9
74b	Deadwood/RX	ms	vgl	<20/rx	4	4	5	H	1
74c	Deadwood/RX	ms	vgl	<20/rx	4	4	5	H	10
74d	Deadwood/RX	ms	vgl	<20/rx	4	5	6	H	108
77a	Isinglass	glc	vcbsl	60+	3	3	4	L	42
77b	Isinglass	glc	vcbsl	60+	3	3	4	M	126
77c	Isinglass	glc	vcbsl	60+	3	3	4	H	103
77cd	Isinglass	glc	vcbsl	60+	3	3	4	VH	36



77d	Isinglass	glc	vcbsl	60+	3	3	4	VH	5
94ab	Mountainlake	ms	vgsl	40-60	4	4	4	H	7
94b	Mountainlake	ms	vgsl	40-60	4	4	4	H	11
94c	Mountainlake	ms	vgsl	40-60	4	4	4	H	28
94d	Mountainlake	ms	vgsl	40-60	4	4	4	VH	1

## Appendix C – Soil Interpretations- Alternative 2

Unit #	Acres	Treatment	Dominant Soil Mapunit	Compaction Hazard Rating	Erosion Hazard Rating			Post-Project Soil Cover
					Current	Max	Post-Project	
524-1	26	Handpile	664c	M	L	H	M	70
524-100	570	Prescribed Fire	460cd	M	L	H	M	70
524-101	12	Handpile/Masticate	77b	M	L	H	M	70
524-102	38	Handpile/Masticate	77a	M	L	H	M	70
524-11	11	Handpile	692b	M	L	H	M	70
524-16	10	Handpile	664c	M	L	H	M	70
524-2	15	Handpile	664c	M	L	H	M	70
524-21	5	Handpile	77b	M	L	H	M	70
524-23	2	Handpile	600c	M	L	H	M	70
524-26	9	Handpile	211c	M	L	H	M	70
524-27	6	Handpile	664c	M	L	H	M	70
524-3	19	Handpile	664c	M	L	H	M	70
524-33	13	Handpile	460cd	M	L	H	M	70
524-37	16	Handpile	351d	M	L	H	M	70
524-38	3	Handpile	600c	M	L	H	M	70
524-4	8	Handpile	460cd	M	L	H	M	70
524-42	3	Handpile	405d	M	L	H	M	70
524-5	15	Handpile	460cd	M	L	H	M	70
524-53	4	Ground Based	77b	M	L	H	M	70
524-54	33	Skyline	186c	M	L	H	M	70
524-55	52	Skyline	211c	M	L	H	M	70
524-66	18	Handpile	511c	M	L	H	M	70
524-68	1	Handpile	460cd	M	L	H	M	70
524-71	10	Handpile	211cd	M	L	H	M	70
524-89	18	Handpile	186d	M	L	H	M	70
524-9	8	Handpile	77b	M	L	H	M	70
524-90	17	Handpile	460cd	M	L	H	M	70
524-91	17	Ground Based	405d	M	L	H	M	70
526- 1	47	Handpile	493b	M	L	H	M	70
526-091	8	Handpile	304a	M	L	H	M	70
526-10	7	Handpile	493c	M	L	H	M	70
526-100	2	Handpile	493c	M	L	H	M	70
526-101	20	Handpile	100c	M	L	H	M	70
526-102	8	Handpile	511c	M	L	H	M	70

526-103	13	Skyline	304c	M	L	H	M	70
526-104	20	Ground Based	304b	M	L	H	M	70
526-106	2	Ground Based	6c	M	L	H	M	70
526-109	51	Skyline	493c	M	L	H	M	70
526-10a	8	Ground Based	77c	M	L	H	M	70
526-11	4	Ground Based	493b	M	L	H	M	70
526-110	22	Skyline	304b	M	L	H	M	70
526-111	8	Skyline	304c	M	L	H	M	70
526-113	5	Skyline	6d	M	L	H	M	70
526-114	8	Handpile	100b	M	L	H	M	70
526-124	4	Handpile	493c	M	L	H	M	70
526-125	6	Skyline	571c	M	L	H	M	70
526-126	4	Handpile	304c	M	L	H	M	70
526-127	12	Handpile	6c	M	L	H	M	70
526-13	24	Ground Based	493c	M	L	H	M	70
526-130	9	Handpile	460cd	M	L	H	M	70
526-14	0	Ground Based	304c	M	L	H	M	70
526-143	4	Handpile	493b	M	L	H	M	70
526-144	36	Handpile/Masticate	493b	M	L	H	M	70
526-146	17	Ground Based	304b	M	L	H	M	70
526-15	8	Ground Based	100c	M	L	H	M	70
526-16	3	Ground Based	100b	M	L	H	M	70
526-19	8	Ground Based	493b	M	L	H	M	70
526-193	38	Handpile/Masticate	511c	M	L	H	M	70
526-194	162	Prescribed Fire	493c	M	L	H	M	70
526-195	288	Prescribed Fire	304c	M	L	H	M	70
526-196	1357	Prescribed Fire	493b	M	L	H	M	70
526-197	10	Endline	304b	M	L	H	M	70
526-198	24	Handpile/Masticate	186d	M	L	H	M	70
526-199	114	Handpile/Masticate	304c	M	L	H	M	70
526-19a	4	Handpile	493b	M	L	H	M	70
526-20	9	Ground Based	493b	M	L	H	M	70
526-23	20	Handpile	186d	M	L	H	M	70
526-24	7	Ground Based	100c	M	L	H	M	70
526-25	5	Handpile	493b	M	L	H	M	70
526-26	45	Handpile	493b	M	L	H	M	70
526-28	7	Handpile	628c	M	L	H	M	70
526-29	6	Handpile	493b	M	L	H	M	70
526-3	11	Handpile	493b	M	L	H	M	70
526-30	27	Ground Based	493c	M	L	H	M	70
526-31	27	Ground Based	493b	M	L	H	M	70
526-32	4	Handpile	493b	M	L	H	M	70

526-33	3	Ground Based	493b	M	L	H	M	70
526-34	29	Handpile	460cd	M	L	H	M	70
526-37	3	Handpile	493b	M	L	H	M	70
526-38	15	Handpile	628c	M	L	H	M	70
526-39	2	Handpile	493b	M	L	H	M	70
526-4	33	Handpile	6d	M	L	H	M	70
526-40	2	Handpile	493b	M	L	H	M	70
526-41	23	Ground Based	493b	M	L	H	M	70
526-418	18	Ground Based	304b	M	L	H	M	70
526-43	7	Handpile	493b	M	L	H	M	70
526-44	8	Handpile	493b	M	L	H	M	70
526-45	10	Handpile	493c	M	L	H	M	70
526-49	3	Handpile	493b	M	L	H	M	70
526-52	2	Handpile	368c	M	L	H	M	70
526-59	7	Handpile	368c	M	L	H	M	70
526-6	5	Handpile	304b	M	L	H	M	70
526-63	5	Handpile	351cd	M	L	H	M	70
526-64	55	Skyline	304c	M	L	H	M	70
526-65	3	Handpile	304c	M	L	H	M	70
526-66	7	Handpile	304b	M	L	H	M	70
526-69	8	Handpile	304c	M	L	H	M	70
526-73	28	Ground Based	304b	M	L	H	M	70
526-74	9	Handpile	493b	M	L	H	M	70
526-76	10	Ground Based	304b	M	L	H	M	70
526-8	6	Ground Based	493b	M	L	H	M	70
526-80	10	Ground Based	304c	M	L	H	M	70
526-84	9	Handpile	493b	M	L	H	M	70
526-85	19	Skyline	304c	M	L	H	M	70
526-86	38	Skyline	304c	M	L	H	M	70
526-89	25	Ground Based	304b	M	L	H	M	70
526-9	5	Ground Based	493c	M	L	H	M	70
526-90	47	Skyline	304c	M	L	H	M	70
526-92	8	Handpile	304b	M	L	H	M	70
526-96	27	Ground Based	304b	M	L	H	M	70
526-97	8	Skyline	304c	M	L	H	M	70
526-98	73	Ground Based	493b	M	L	H	M	70
527- 1	14	Handpile	460cd	M	L	H	M	70
527-10	27	Handpile	640c	M	L	H	M	70
527-100	22	Handpile	460cd	M	L	H	M	70
527-103	7	Handpile	640c	M	L	H	M	70
527-106	15	Handpile	460c	M	L	H	M	70
527-11	39	Handpile	640c	M	L	H	M	70

527-12	22	Ground Based	493b	M	L	H	M	70
527-120	6	Handpile	6c	M	L	H	M	70
527-122	5	Handpile	6c	M	L	H	M	70
527-123	15	Handpile	460c	M	L	H	M	70
527-13	16	Handpile	493b	M	L	H	M	70
527-131	15	Handpile	511c	M	L	H	M	70
527-132	3	Handpile	460cd	M	L	H	M	70
527-133	9	Handpile	493b	M	L	H	M	70
527-134	4	Handpile	493c	M	L	H	M	70
527-14	10	Handpile	493b	M	L	H	M	70
527-140	1	Handpile	460cd	M	L	H	M	70
527-15	40	Handpile	460cd	M	L	H	M	70
527-150	29	Skyline	640c	M	L	H	M	70
527-151	6	Skyline	493c	M	L	H	M	70
527-17	21	Handpile	460cd	M	L	H	M	70
527-18	6	Handpile	493c	M	L	H	M	70
527-19	9	Handpile	511c	M	L	H	M	70
527-2	5	Handpile	460cd	M	L	H	M	70
527-22	8	Handpile	493b	M	L	H	M	70
527-23	6	Handpile	460c	M	L	H	M	70
527-24	10	Handpile	640c	M	L	H	M	70
527-25	9	Handpile	511c	M	L	H	M	70
527-26	22	Handpile	460cd	M	L	H	M	70
527-28	10	Handpile	640c	M	L	H	M	70
527-29	9	Ground Based	493c	M	L	H	M	70
527-3	23	Handpile	460cd	M	L	H	M	70
527-35	12	Handpile	640a	M	L	H	M	70
527-36	3	Handpile	460c	M	L	H	M	70
527-38	4	Handpile	640c	M	L	H	M	70
527-40	5	Handpile	640cd	M	L	H	M	70
527-41	7	Handpile	640c	M	L	H	M	70
527-42	3	Handpile	493c	M	L	H	M	70
527-44	5	Handpile	511d	M	L	H	M	70
527-45	10	Handpile	493b	M	L	H	M	70
527-46	21	Handpile	460c	M	L	H	M	70
527-49	9	Handpile	511c	M	L	H	M	70
527-5	18	Handpile	628b	M	L	H	M	70
527-50	9	Handpile	304c	M	L	H	M	70
527-51	14	Handpile	460cd	M	L	H	M	70
527-52	13	Handpile	493a	M	L	H	M	70
527-54	17	Handpile	628c	M	L	H	M	70
527-58	28	Handpile	529b	M	L	H	M	70

527-61	8	Handpile	460c	M	L	H	M	70
527-62	4	Handpile	640b	M	L	H	M	70
527-64	28	Handpile	529b	M	L	H	M	70
527-7	13	Handpile	511d	M	L	H	M	70
527-70	5	Handpile	640c	M	L	H	M	70
527-73	4	Handpile	640c	M	L	H	M	70
527-75	2	Handpile	493b	M	L	H	M	70
527-8	20	Handpile	493a	M	L	H	M	70
527-81	14	Ground Based	670b	M	L	H	M	70
527-82	4	Ground Based	304c	M	L	H	M	70
527-83	11	Handpile	460c	M	L	H	M	70
527-88	26	Skyline	493b	M	L	H	M	70
527-9	4	Handpile	460c	M	L	H	M	70
527-98	28	Skyline	493b	M	L	H	M	70
528-13	1	Handpile	493d	M	L	H	M	70
528-27	12	Handpile	511c	M	L	H	M	70
528-3	12	Handpile	648d	M	L	H	M	70
528-30	10	Handpile	493b	M	L	H	M	70
528-31	14	Handpile	648d	M	L	H	M	70